

METHOD AND APPARATUS FOR IMPORTING DIGITAL SWITCHING SYSTEM DATA INTO A SPREADSHEET PROGRAM

BACKGROUND OF THE INVENTION

5 1. Field of the Invention

The present invention generally relates to digital switches and digital switching systems used in telecommunication networks. More particularly, the present invention relates to the access, viewing, and modification of data output by digital switches/switching systems for diagnostic, maintenance, 10 and other purposes.

2. Background

Modern digital switches and digital switching systems such as the widely used 5ESS® (a registered trademark of Lucent Technologies, Inc., the assignee of the present invention) are responsible for efficiently switching 15 large volumes of telephone calls and the likes. Such switches are used in and between a variety of telecommunications systems such as Public Switched Telephone Networks (PSTNs), Private Branch Exchanges (PBXs), and mobile telephone networks, to name a few.

20 For a variety of reasons such as diagnostics, field testing, and software maintenance, digital switches such as the 5ESS® output and store a database

of raw data which keeps track of switch hardware changes, switch software changes, switching activities, and responses to testing, troubleshooting routines, new product installation, and other things.

Prior art switch data retrievers require that users retrieving switch data
5 have extensive knowledge about the particular switch database involved by
being proficient in the special query commands peculiar to the switch data-
base. For example, the 5ESS® switch outputs Recent Change and Verify
(RC/V) data which when using prior art methods must be accessed one entry
at a time using the RC/V screens. Alternatively, a group of RC/V screen
10 data can be downloaded into a large text file through which the user must
sift.

Direct access to the RC/V screens requires knowledge of a large num-
ber of access keys, of which the user may not be familiar, or as a substitute,
a user must execute a large number of time-consuming query commands to
15 identify such keys. Such keys may vary from switch database to switch da-
tabase and depend on many factors which may not be familiar to the user,
including the data provisioning of the particular switch.

What is of great interest but heretofore unavailable, is a user-friendly
switch data retriever with rapid switch data access, and which is not depend-

ent (on the user's end) upon the peculiarities of the particular switch data-base involved.

SUMMARY OF THE INVENTION

5 In view of the aforementioned problem and deficiencies of the prior art, the present invention provides, in a telecommunication system, a method of providing a user with data from a digital switching system. The method at least includes the steps of receiving raw data output from a digital switch, and, via a converter, converting the raw data into a format compatible with a 10 predefined spreadsheet program. The method also at least includes the step of outputting converted data to and storing the converted data in at least one predefined workbook of the spreadsheet program.

15 The present invention also provides, in a telecommunication system, an apparatus for providing a user with data from a digital switching system. The apparatus at least includes a data receiver adapted to receive raw data from a digital switch. The apparatus also includes a data converter coupled to the data receiver and adapted to convert raw data into a format compatible with a predefined spreadsheet program. And, the apparatus at least includes a data output device coupled to an output of the data converter. The data

output device is adapted to transmit and store converted data to at least one predefined workbook of the spreadsheet program.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

5 Features and advantages of the present invention will become apparent to those skilled in the art from the description below, with reference to the following drawing figures, in which:

Figure 1 is a schematic block diagram of a basic switch data system using the present-inventive apparatus (“switch data examiner”);

10 Figure 2 is a flowchart/algorithm detailing the process overview of the present-inventive switch data examiner; and

Figure 3 is a flowchart/algorithm detailing the step in the algorithm of Figure 2 regarding importing a Query Output into a spreadsheet program.

15 DESCRIPTION OF THE PREFERRED EMBODIMENTS

1. Basic Switch Data Examiner Hardware and Operation

The switch data examiner 106 incorporating the present invention is part of the switch data system 100 shown in Figure 1. The switch data system 100 includes a digital switch/switching system 102 for switching the 20 telephone calls and transactions of one or more telephone networks such as a

Public Switched Telephone Network (PSTN) 110, a Private Branch Exchange (PBX) 112, and an Intelligent Network (IN) 114. The aforementioned 5ESS® serves as the digital switch 102 in the preferred embodiment. However, those skilled in the art will recognize that other digital switches 5 can be used without departing from the scope and spirit of the present invention.

Switch data from the digital switch 102 is output to a server 104 in the present embodiment. The server 104 contains the present-inventive Switch Data Examiner (SDE) 106 for the efficient accessing, converting and displaying 10 of switch data. The converted data is output to a user's computer 108. Those skilled in the art will also appreciate that the SDE 106 need not reside in a server, but could be installed in a user's computer (or PC) 108 instead.

The SDE 106 converts the raw data received from the digital switch 15 102 into a format compatible with the Microsoft® Excel program. The present invention is not limited to use with the Microsoft® Excel program, but is also operational with spreadsheet programs in general. Once the raw data is available from the digital switch 102, the user can execute a "Make Workbook" Command via the SDE 106. The user can also program Scripts 20 as are known in the art for automatically running Query Commands to ob-

tain and then transfer raw data on a periodic basis at the switch 102. The Query Commands are executed at the digital switch 102, and the data is transferred to the SDE 106. The SDE 106 then imports the data into a spreadsheet Workbook specified by the user. Also, the output of the SDE 5 106 can be used as a layout to prepare scripts that can be transferred to the data switch 102 and executed there to make changes to the switch database.

The user-friendly nature of the present invention lends itself to many uses, including but not limited to, digital switch and database analysis and troubleshooting, new product introduction testing to insure proper operation 10 in the field of laboratory-tested digital switches, and customer acceptance testing procedures to insure that a switch functions properly for a customer when installed.

2. Detailed Switch Data Examiner Operation

15 The algorithm 200 for requesting and importing switch data into a spreadsheet program is illustrated in Figures 2 and 3.

After the start (Step 202) of the algorithm 200, the user prepares a Script including Query Commands for periodic execution. The Scripts are executed in Step 206, and this action causes the switch data to be output 20 from the switch 102. The SDE 106 converts the switch data and imports it

into the spreadsheet Workbook specified by the user in Step 210. Step 210 is detailed in Figure 3, *infra*.

If the Workbook specified by the user is available, its Worksheets are updated (Steps 212 and 214). If the specified Workbook is not available, 5 then a new Workbook is created.

Referring to Figure 3, the Query Data importing step (210) is described in more detail. After the start (Step 302), the user is asked for the path and name of the Query Output files of the switch 102 that the user desires in Step 304. Next, the user is queried for the path and name for the 10 Workbook that will store the updated switch data in Step 306. If the Workbook specified in Step 306 exists, it is opened so that one or more of its Worksheets can be updated (Steps 308 and 310). If the Workbook specified in Step 306 does not exist, a new Workbook is established and opened in Step 312.

15 When the Workbook already exists, the Query Output data files are imported into the Workbook in Step 314. This is followed by Step 316, in which the algorithm determines whether the Output data files are simply to be added to the existing Workbook. If so, the old data is stored in the worksheet designated <worksheet>, while the new data is imported into the worksheet designated <worksheet>.2 (Step 317). The Workbook is saved with 20

the new data (Step 318) stored in the second version of the Worksheet (the old data Worksheet name is not changed). If the name of the new output data worksheet is to be the same as the old output data worksheet (in order to execute tools for data comparison, for example), then the name of the existing worksheet is changed to indicate that it is an older version, and the new data is imported with the desired worksheet name (Step 320). Thereafter, the Workbook is saved in Step 318, followed by the end of this portion of the software at Step 324.

Returning to Step 312, having created a new Workbook, the SDE imports the Query Output files in said Workbook in Step 322.

Variations and modifications of the present invention are possible, given the above description. However, all variations and modifications which are obvious to those skilled in the art to which the present invention pertains are considered to be within the scope of the protection granted by this Letters Patent.